

Life Sciences as Related to Space (F)

Space Radiation - Dosimetric Measurements and Related Models, Radiation Detector Developments and Ground-based Characterisation (F2.3)

ESA ACTIVE DOSIMETER A TECHNOLOGY DEMONSTRATION FOR ISS AND BEYOND

Ulrich Straube, ulrich.straube@esa.int

European Space Agency, Cologne, Germany

Thomas Berger, thomas.berger@dlr.de

German Aerospace Center (DLR), Cologne, Germany

Human presence in space has increased significantly over the last decade. Extended space flights supported by various international crews that lasted half a year and longer became a reality. Challenges to human health and well-being proved to remain significant and increasing with mission-length and workload. Ongoing strong efforts did enable for such mission scenarios and shall do so for the future, the human journey to deep space that is intended. Several of the risks arising seem to have the potential to be mitigated and finally covered sufficiently. Despite health risks from ionizing radiation during extended exploratory deep space missions remain to be of significance and may strongly limit human presence and mission goals beyond Low Earth Orbit. The ESA Active Dosimeter [EAD] hardware enables for advanced personal dosimetry capabilities in real time. The system consists of several small portable Personal Active Dosimeters (MU = Mobile Unit's) as well as a surface attached docking station, called "Personal Storage Device (PSD)". The PSD provides data read-out data and advanced display capabilities as well as data storage and telemetry. The PSD contains a Tissue Equivalent Proportional Counter (TEPC) and an internal MU (iMU) for advanced analysis of the complex radiation environment in the space station and to ensure means of cross calibrations. The MU is applied for personal dosimetry as well as used for area monitoring purposes throughout the station. Verification of the system capabilities have been successfully executed in flight on ISS. Further utilization has been recommended by the ISS partner agencies. System developments and testing, including operations during a future flight of NASA's Orion program, is en-route. This presentation will give an overview of the relevant data from the first year of operations on ISS.